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CW#104: Vertical Motion

Geometry

**Show all notes and work on this sheet.**

*EXPLORATION*

To many the most frightening predator has become even more frightening. Off the coast of South Africa Great White sharks have evolved to jump fully out of the water to hunt their prey.

**Plot the following points describing the Great White’s jump on the graph provided.** On the y-axis ***h*** will represent the height (in feet) of the jump and on the x-axis ***t*** will represent the time (in seconds) in the air.

|  |  |
| --- | --- |
| ***t*** | ***h*** |
| 0 | 0 |
| 0.25 | 5 |
| 0.50 | 8 |
| 0.75 | 9 |
|  |  |
|  |  |
|  |  |

**Sketch the graph after you plot the points. Think. What will the rest of the graph look like?**

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The path of the Great White in the air is represented by +24t + 0.

**SHOW ALL YOUR WORK ON THIS SHEET.**

1) Find the axis of symmetry, draw and label it on the graph.

2) Find the vertex. Label it on the graph. What does the vertex of this graph represent?

3) Find the y-intercept. Label it on the graph. What does the y-intercept of this graph represent?

4) If you dove from a 20 foot high diving board into the water, how would the y-intercept of your graph be different from the Great White’s graph?

5) Find the x-intercepts using the Quadratic Formula. Plot and label both on the graph. What do the x-intercepts of this graph represent?

6) Fill in your table for ***t=1, t=1.25, and t=1.5***. Complete your graph. Label your points in the table.

7) What do you think the ***a (a=-16)*** of this equation represent?

8) What do you think the ***b (b=24)*** of this equation represents?

9) What other real-life situations can be represented by a parabola?

**Use the following equation unless given another in the problem.**

**where *t* is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_the object has been in the air, *v* is\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_,**

**and *s*\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.**

**Round your answers to the nearest hundredth value.**

10) A soccer ball is kicked upward from the ground with an initial vertical velocity of 40 feet per second.

a) After how many seconds does it land?

b) What was the maximum height of the ball?

11) A cat leaps from the ground into the air with an initial vertical velocity of 9 feet per second.

a) After how many seconds does the cat land on the ground?

b) How high did the cat jump?

12) A diver jumps with an initial velocity of 4 feet per second from a diving board that is 20 feet high.

a) What is your equation?

b) After how many seconds does the diver enter the water?

c) What was the maximum height of the jump?

13) VANG #11 on a separate sheet of paper

14) VANG #12 on a separate sheet of paper